From one pandemic to another: emerging lessons from COVID-19 for tackling physical inactivity in cities

From one pandemic to another: emerging lessons from COVID-19 for tackling physical inactivity in cities

Craig W. McDougall[a], Caroline Brown[b], Craig Thomson[c], Nick Hanley[d], Mark A. Tully[e], Richard S. Quilliam[a], Phil J. Bartie[f], Lesley Gibson[g], David M. Oliver[a]

[a] Biological & Environmental Sciences, Faculty of Natural Sciences, University of Stirling, Stirling, UK

[b] The Urban Institute, School of Energy, Geoscience, Infrastructure and Society, Heriot Watt University, Edinburgh, UK

[c] School of Computing, Engineering and Built Environment, Glasgow Caledonian University, Glasgow, UK

[d] Institute of Biodiversity Animal Health and Comparative Medicine, University of Glasgow, Glasgow, UK

[e] Institute of Mental Health Sciences, School of Health Sciences, Ulster University, Newtownabbey, UK

[f] School of Mathematical and Computer Sciences, Heriot Watt University, Edinburgh, UK

[g] School of Engineering, University of Edinburgh, Edinburgh, UK

Craig W. McDougall corresponding author: c.w.mcdougall@stir.ac.uk

Abstract

Physical inactivity is a global pandemic. The COVID-19 crisis has altered global patterns of physical activity in ways that were unimaginable before the outbreak. Enforced restrictions on mobility and the mass closure of indoor fitness centres has highlighted the limitations of many urban areas for enabling physical activity and reinforced inequalities in physical activity opportunities across cities. However, unprecedented reductions in mobility and increases in localised physical activity provide unique insight on opportunities for urban health promotion. COVID-19 responses can therefore, encourage new perspectives in urban planning and inspire novel future strategies to design more sustainable, healthier and equitable cities.

Key words: Physical activity; Neighbourhood inequality; Urban planning

Physical inactivity is one of the leading risk factors for global morbidity and mortality and has been described as a world-wide health pandemic with extensive economic, environmental, and social consequences (Kohl et al., 2012). Regular physical activity offers a variety of benefits for mental and physical health and contributes to the prevention of communicable diseases, such as viral and bacterial infections, and noncommunicable diseases (NCDs), such as diabetes and coronary heart disease. The World Health Organisation (WHO) has a target of reducing global physical inactivity by 10 % by 2025; however, this target will likely be missed as rates of inactivity continue to rise in many high-income countries (Guthold et al., 2018).

The outbreak of Coronavirus Disease-19 (COVID-19) and the public health measures put in place to curb its transmission have rapidly and radically altered global patterns of physical activity. Restrictions on mobility and the mass closure of indoor fitness centres have localised opportunities for physical activity, by only permitting outdoor exercise in the immediate neighbourhood. Despite these restrictions, physical activity can play a key role in mitigating the health challenges presented by COVID-19 and the physical and mental health side effects of the control measures designed to decrease the spread of the virus (Mattioli et al., 2020). Physical inactivity and COVID-19 are, therefore, inextricably linked and urban policy-makers should address these public health challenges synergistically in order to generate a positive legacy from the COVID-19 crisis. This commentary seeks to establish emerging opportunities, insights and research questions related to the impact of COVID-19 on physical activity patterns and inequalities in opportunities for physical activity in cities.

It is well established that significant life events can prompt major changes to physical activity patterns (Engberg et al., 2012) and the COVID-19 crisis will likely have multi-directional effects on physical activity levels in cities. For some, behaviours of recreational physical activity, such as organised sport or the use of indoor fitness centres have been disrupted. Loss of employment and shifts towards home-working mean reductions in physical activity from active travel for some, whilst for others home-working may provide a chance to increase active lifestyle choices. Additionally, government promotion of daily exercise to avoid the unintended health consequences of COVID-19 mitigation measures may encourage more active behaviours. Substantial variations in lifestyle are changing individual

capabilities and opportunities for physical activity in cities and understanding these changes and their lasting effect gives rise to a number of important policy-relevant research questions. Indeed, the emerging research questions and public health challenges are three-fold: (i) how can healthy activity habits and practices that have been disrupted by COVID-19 be re-established (ii) where this is not possible, can alternative opportunities be identified and facilitated to minimise physical inactivity; and (iii) what can be done to support the continuation of positive changes to physical activity that have been developed as a result of COVID-19 interventions?

As COVID-19 induces multi-directional effects on global physical activity patterns, existing inequalities in physical activity opportunities are being reinforced and new inequalities are emerging. Participation in physical activity is often greater in neighbourhoods with lower reported crime, more green, blue and open space and better walkability, although these characteristics vary significantly among neighbourhoods (Wolch, Byrne and Newell, 2014). Restrictions on mobility reinforce differences in neighbourhood characteristics and inequalities in the ability of neighbourhoods to support physical activity are, therefore, more apparent than ever. These reinforced inequalities mean that experiences of restricted mobility or 'lockdown' will differ substantially among urban populations. There could be considerable benefit to public health throughout and beyond the COVID-19 pandemic if national and local governments recognise these differences and identify opportunities to reduce area-level inequalities e.g. by permitting access to semi-private green space or implementing temporary pedestrianisation. Such interventions can be particularly beneficial in neighbourhoods with an absence of characteristics that support physical activity, such as those with insufficient green or open space provision and poor walkability and active travel infrastructure.

The potential for COVID-19 mitigation to reinforce inequalities in physical activity opportunities extends beyond the built environment and may occur through the economic and social systems of cities. As such, effective short and long-term mitigation strategies must be viewed through the lens of gender, age and deprivation to avoid increasing disparities in physical activity opportunities that are often present in high income countries (Althoff et al., 2017). For example, the widespread closure of schools and shifts towards digital schooling eliminates an important resource for adolescent physical activity.

Whilst, in some cultures, there are issues related to the cultural acceptance of women exercising in public spaces and these issues may be exacerbated by the closure of indoor or gender-specific fitness centres. Collectively, these concerns highlight a critical research question: what are the short and long-term inequalities for physical activity opportunities emerging from COVID-19 responses and what adaptive and mitigate measures can be introduced to limit their effect?

Whilst COVID-19 generates many challenges for physical inactivity, the pandemic offers the possibility to think, design and plan more radically to improve opportunities for physical activity in cities and reduce inequalities in physical activity opportunities across neighbourhoods. Mobility restrictions as a consequence of COVID-19 have caused substantial reductions in traffic flow and improvements in air quality in cities making many urban areas more suitable for physical activity than before the outbreak. Moreover, cities across the world are implementing temporary or "pop up" cycle infrastructure and pedestrianisation to alleviate motorised transport dominance, thus increasing public space and enabling safer exercise and active travel. Responses to COVID-19 have therefore, shown that reorganising public space in cities to promote physical activity and reducing barriers to physical activity, such as motorised transport presence, is both possible and effective. Future research should seek to understand the feasibility of sustaining (or partly sustaining) these strategies in post COVID-19 policy trajectories to ensure positive effects for physical activity. Identifying and prioritising locations where temporary reorganisations of space are most effective in terms of increases in physical activity participation and most valuable in overcoming insufficient opportunities for physical activity and neighbourhood inequalities represent key research avenues for investigation. Research that seeks to quantify the effects of reorganising public space on physical activity patterns and barriers to physical activity among different demographic groups that is based on empirical data rather than anecdotal evidence will be particularly valuable to inform future city planning and policy decisions. Personal Global Positioning Systems (GPSs) such as mobile fitness tracking applications and fitness wearables offer a valuable data source to quantify physical activity patterns in these temporary spaces and underpin future policy.

Opportunities for innovative physical activity planning and remediating neighbourhood inequalities can also gain inspiration from the 'home-workout' movement which has been catalysed by global

recommendations of household confinement. This new exercise trend, supported by international governments, sports stars and celebrities, has seen everyday household spaces in cities across the world reimagined, as furniture becomes temporary fitness equipment and living spaces become multifunctional. Home-workouts challenge conceptions of 'normal' behaviour in everyday spaces and exploring the transferability of this process for city infrastructure and outdoor public spaces may offer potential to overcome the limitations of many urban environments for facilitating physical activity. Children and other subgroups of society, including skateboarders and those who partake in free-running/parkour often use the public realm and urban space in ways not foreseen or imagined by urban designers. However, urban governance often deters such behaviour by 'designing-out' processes or by legislating against it due to associations with nuisance or crime. Indeed, unlike privately owned household spaces, without effective management multifunctional public spaces can cause conflict among different users groups (Iojă et al., 2014). However, the adoption of inclusive urban planning and management approaches (Fig.1), rather than preventative design strategies, can encourage a more collaborative approach between multiple stakeholders and users groups to create multifunctional urban infrastructure and (re)design public space to encourage and enable physical activity. As cities densify, the benefits of multifunctional infrastructure and public space is becoming increasingly apparent, particularly in neighbourhoods with limited resources. Harnessing insights from the growing home-work out movement by collaborating with key individuals and organisations that facilitate and design home-work outs and developing case studies of innovative exercise routines and novel uses of everyday space highlights an opportunity to radically re-think the public realm as a resource for physical activity and a novel area of future research.

The COVID-19 crisis has changed physical activity patterns in cities in ways that were unimaginable before the outbreak and inequalities in physical activity opportunities among neighbourhoods have been reinforced, whilst new inequalities are emerging. We, therefore, have a truly unique opportunity to critically review our urban environments and their ability to support and enable physical activity. Thus, addressing physical inactivity and COVID-19 synergistically offers scope to generate a positive legacy from the crisis. Clearly, a new wave of public health thinking based upon preventing ill-health is

140 required to remediate COVID-19 and to ensure cities are more resilient to future infectious disease
141 outbreaks. However as concepts such a 'social distancing' become embedded in the global public health
142 lexicon, we must not lose sight of other public health challenges including physical inactivity and
143 neighbourhood inequality and ensure that cities are not just places of ill-health prevention, but places
144 of health promotion. For some, as post COVID-19 normalities begin to emerge and restrictions on travel
145 are reduced, opportunities for physical activity beyond their own neighbourhood will resume. For more
146 vulnerable members of society with limited mobility, such as children, the elderly and those without
147 the physical or economic means to travel, the neighbourhood remains crucial for physical activity. As
148 normality returns, our collective experience of the geographies of some of the most vulnerable in society
149 should be used as a valuable reminder that to create more sustainable, healthier and equitable cities, we
150 must enable physical activity for all.

151

152 **Acknowledgements**

153 The Scottish Government Hydro Nation Scholars Programme provided funding to support this research.

Figure

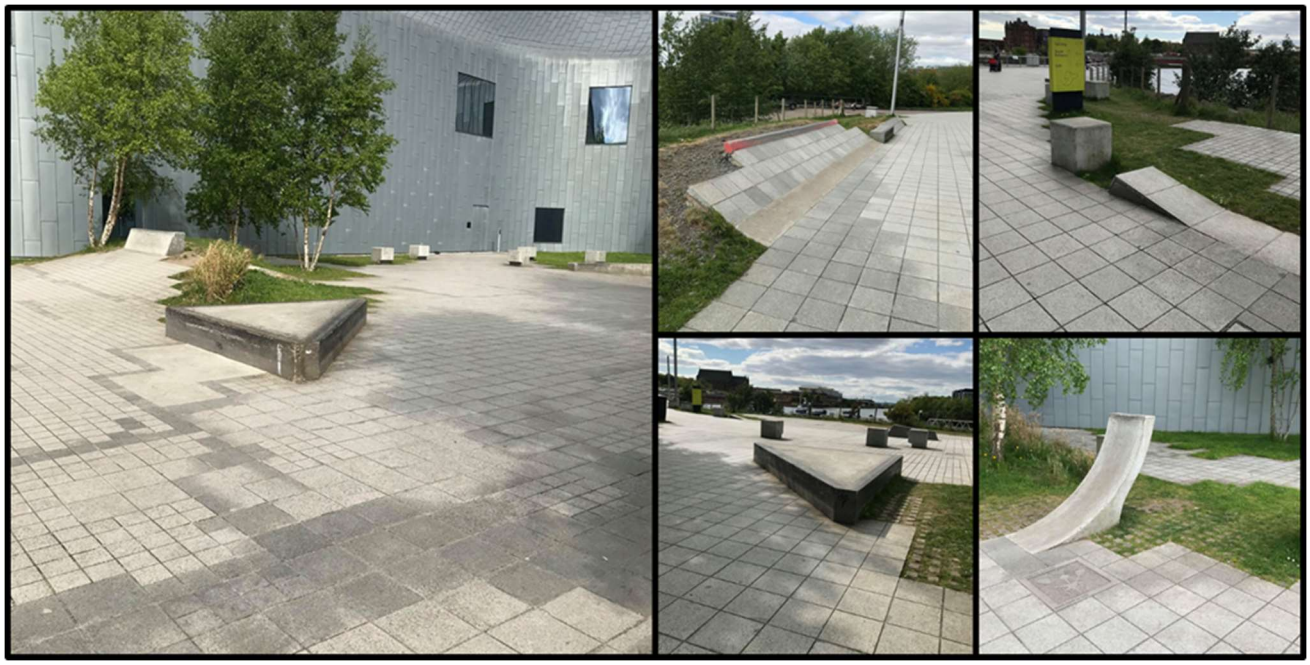

Fig. 1: Riverside Museum, Glasgow, Scotland. A co-design process involving local authorities and skateboarders enabled the creation of a multifunctional shared urban space. Subtle design features make the area almost unrecognisable as a designated skating location thus catering to the needs of skateboarders, who sought "street like" features and members of the public and museum visitors by providing an open space that is suitable for play, socialising and physical activity.

References

Althoff, T. et al. (2017) 'Large-scale physical activity data reveal worldwide activity inequality HHS Public Access', Nature, 547(7663), pp. 336–339. doi: 10.1038/nature23018.

Engberg, E. et al. (2012) 'Life events and change in leisure time physical activity: A systematic review', Sports Medicine. Springer, pp. 433–447. doi: 10.2165/11597610-000000000-00000.

Guthold, R. et al. (2018) 'Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants', The Lancet Global Health. Elsevier Ltd, 6(10), pp. e1077–e1086. doi: 10.1016/S2214-109X(18)30357-7.

Iojă, C. I. et al. (2014) 'The potential of school green areas to improve urban green connectivity and multifunctionality', Urban Forestry and Urban Greening. Urban und Fischer Verlag GmbH und Co. KG, 13(4), pp. 704–713. doi: 10.1016/j.ufug.2014.07.002.

Kohl, H. W. et al. (2012) 'The pandemic of physical inactivity: Global action for public health', The Lancet. Lancet Publishing Group, pp. 294–305. doi: 10.1016/S0140-6736(12)60898-8.

Mattioli, A. V. et al. (2020) 'COVID-19 pandemic: the effects of quarantine on cardiovascular risk', European journal of clinical nutrition. NLM (Medline), pp. 1–4. doi: 10.1038/s41430-020-0646-z.

176 Wolch, J. R., Byrne, J. and Newell, J. P. (2014) 'Urban green space, public health, and environmental
177 justice: The challenge of making cities "just green enough"', Landscape and Urban Planning, 125, pp.
178 234–244. doi: 10.1016/j.landurbplan.2014.01.017.